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# World War II as reflected on capital markets

Bruno S. Frey\*, Marcel Kucher

*University of Zurich, Institute for Empirical Economic Research, Blumlisalpstrasse 10, CH-8006 Zurich, Switzerland*

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## Abstract

Historical events are reflected in asset prices. We analyze government bond prices of five European countries traded on the Swiss bourse during WWII. Apart from the official outbreak of WWII, loss and gain of national sovereignty influenced the capital market. © 2000 Elsevier Science S.A. All rights reserved.

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## 1. Introduction

This paper econometrically analyzes changes in financial values as reflections of events in and before World War II. The change in the values of national government bonds issued in Swiss Francs and traded on the Swiss bourse is examined for the period 1933–1946. The Swiss government, for reasons of neutrality, refrained from interfering in the bond market (except for the 2 months following the German attack against the West in May and June 1940, when the Swiss bourse was closed). The government bond market in Switzerland consisted mainly of five countries: Germany, the main aggressor; Austria, a country integrated into the Third Reich; France, the major and traditional enemy of Germany in the West; Belgium and Switzerland, two neutral countries, the first of which was drawn into the war, while the latter was spared direct involvement.

## 2. Data and estimation procedure

The use of *capital market data* has three particular advantages over other sources of data:

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\*Corresponding author. Tel.: +41-1-634-3731; fax: +41-1-634-4907.

*E-mail address:* bsfrey@iew.unizh.ch (B.S. Frey).

1. They solely reflect the situation obtaining at a given point of time. Future developments and insights cannot enter the data at a later date. Capital market data capture the *expectations* about how a particular war event changes the likelihood of a country servicing and repaying its international debt.
2. Actors on financial markets have strong incentives to carefully evaluate the prevailing situation, as well as any likely future developments, because errors directly affect them in monetary terms. This distinguishes capital market data from data such as surveys or questionnaires.
3. Financial markets usually exhibit a high predictive power, due to so-called *marginal traders*.

The countries that borrowed the most on the Swiss capital market during the time-span between the two world wars were France and Germany, followed by Belgium and Austria. Converted into today's Swiss Francs, the value at emission of the 31 German government bonds equalled roughly 3 billion Swiss Francs. France's government debt in Switzerland equalled 3.6 billion Swiss Francs, and Belgium and Austria borrowed one billion and 590 million Swiss Francs respectively. All the bonds were *issued and traded in Swiss Francs*. A weighted index of the values of all government bonds issued in Switzerland is analyzed for each of these countries. Due to their large number, the analysis is restricted to the 12 biggest *Swiss* government bonds.

The data stem from the '*Monatsberichte der Schweizerischen Nationalbank*', January 1929–January 1949.

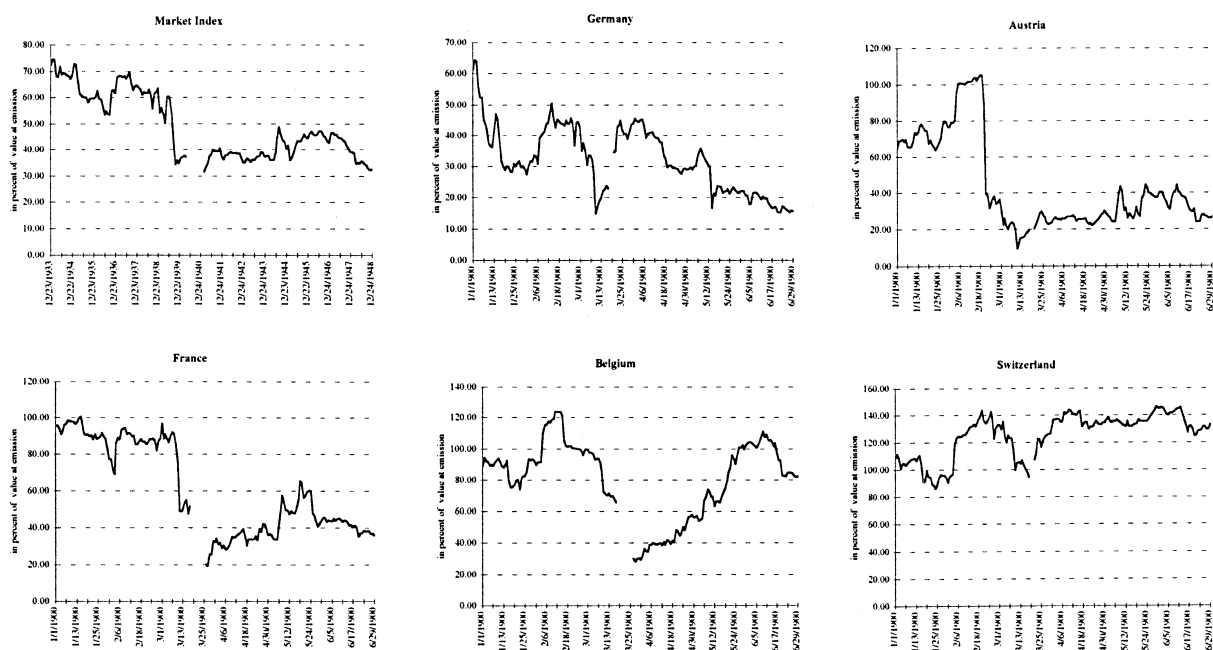


Fig. 1. Monthly publication of the Swiss National Bank (SNB) 1933–1948.

The econometric method applied searches the data for *structural breaks* in the series of government bond prices. The procedure consists in estimating *conditional random walks* within 48 month-windows, which are then tested for differences in the means of the bond prices between the time windows.

To identify all possible dates for structural breaks, a four-step procedure based on Banerjee et al. (1992) and Perron (1989) is applied. Steps one to three determine which periods to look at. In step four, we test for statistically significant structural breaks within each of the windows isolated. A series of the following equations is estimated:

$$\ln p_t = \beta_0 + \beta_1 \ln p_{t-1} + \beta_2 \ln \overline{p_{t-1}} + \gamma_s D_{st} + \epsilon_t \quad (1)$$

with  $s = 6, \dots, 42$ ,  $p_t$  stands for the index-value of all government bonds of the country considered on date  $t$ ,  $\overline{p_t}$  is the index of all government bonds traded in Zurich (a measure of market performance),  $D_{st} = 1$  if date  $t$  is on or after date  $s$  and zero otherwise,  $\epsilon_t$  is a white noise error term. The parameter  $\gamma_s$  measures a change in the conditional mean (i.e. a shift in the mean price index *ceteris paribus*) occurring on date  $s$ .  $\gamma_s$  is the percentage change in the conditional mean. Eq. (1) is estimated repeatedly, each time moving  $s$  by 1 month. For each resulting equation, it is tested whether  $\gamma_s$  is different from zero using a conventional  $F$ -test. The date associated with the highest  $F$ -statistic is then designated as the date where the most important mean shift took place within each window. Similar methods were used by Sobel (1998) or Willard et al. (1996), to identify breaks in the series of exchange rates.

### 3. Estimation results

#### 3.1. The raw data

Fig. 1 shows a strong downturn in the market index before the outbreak of WWII. During the war, the index remained stable at around 40 percent of par. One interesting feature is the peak in 1944, just about the time when the allied forces invaded Normandy.

The 31 *German* government bonds traded in Switzerland experienced a strong reduction in value over the entire period. The partial recovery in 1937 and 1938 may be due to the Nazi government's gain in financial respectability in 1937–1938 (mainly because of the expansion of national income and the fall in unemployment).

But Hitler's aggressive foreign policy and increasing isolation led to a drastic fall in German bond prices towards the end of 1939, when WWII broke out. The value of German government bonds rose again after the successful *Blitzkrieg* at the beginning of 1940, but from the second half of 1941 on, they experienced a permanent fall.

The monthly index of the nine *Austrian* government bonds traded in Switzerland shows a marked increase in value between 1933 and 1937. There was a huge drop with the *Anschluss* (annexation) of Germany in 1938, and the index remained much depressed thereafter.

The raw data for the *French* government bonds show a constant value until the middle of 1938, followed by several drops coinciding with the "official" outbreak of the war, the invasion by German

forces, and the French capitulation (22 June 1940). After trading was resumed at the Swiss bourse, the French bonds experienced a continuous increase in value until the end of 1945.

The values of *Belgian* government bonds traded in Switzerland exhibit marked variations. A marked increase from 1934 to 1937 is followed by an even stronger fall, dropping to a value of about 30% in 1940. Throughout the remainder of World War II, the bond values show a continuous recovery, ending in 1947.

The *Swiss* government bonds display an overall long-term rise of about 30% over the 20-year period 1928–1948. The Swiss government bonds dropped in the years before the ‘official’ outbreak of the war, but after the successful ‘Blitzkrieg’ they regained and even surpassed the pre-war level.

### 3.2. Identification of breaks

Table 1 lists 16 important historical events and compares them to the econometrically estimated (statistically significant) breaks in the government bond values.

Only one event, the ‘official’ outbreak of the Second World War, produces statistically significant

Table 1  
Important “war-events” and break points in government bond series

	Germany	Austria	Switzerland	Belgium	France
<i>Prewar</i>					
Nazi Takeover, January 1933 and “Ermächtigungsgesetz”, March 1933	n.d. <sup>a</sup>	n.d.	–4%	n.d.	n.d.
Röhm Putsch, June/July 1934					
“Allgemeine Wehrpflicht” (general draft), March 1935			–6%		
Occupation of Rheinland, March 1936					–4%
Olympic Games in Berlin, July/August 1936	+8%		+7%		
Anschluss of Austria, March 1938		–46%			
Invasion of the Czechoslovak Republic, March 1939	–17%				
<i>War</i>					
Outbreak of WWII, September 1939	–39%	–46%	+3%	–10%	–25%
Invasion of Belgium, Netherlands and France, May 1940 <sup>b</sup>	+8%		+4%	[–35%] <sup>c</sup>	[–31%] <sup>c</sup>
Invasion of the Soviet Union, June 1941			+4%		
War entry of the United States, December 1941	–5%				
Russian Offensive at Stalingrad, November 1942	–7%				
German Capitulation at Stalingrad, February 1943				+10%	
Allied Invasion in Normandy, June 1944				+6%	+16%
Unconditional Capitulation of the Wehrmacht, May 1945				+7%	
<i>Postwar Arrangements</i>					
Yalta Conference, February 1945	–37%				
Potsdam Conference, August 1945		+12%			

<sup>a</sup> n.d. = no data available.

<sup>b</sup> The Swiss Stock Exchange was closed May 10th through July 8th 1940 and there was no trade with French or Belgian Bonds between May 1940 and February 1941.

<sup>c</sup> Means the difference in the bond values between the day when trading was stopped and when it was resumed. For methodological reasons it is not possible to identify such ‘breaks’ by the econometric techniques used.

break points in *all* five countries. It greatly reduced the value of the government bonds on *both sides* of the conflict, i.e. “Grossdeutschland” and France.

Significant changes in the value of government bonds also occurred whenever a nation was invaded, as happened to Austria in March 1938, Belgium and France in May 1940 and “Germany” (with the Allied Invasion of Normandy) in June 1944. The final capitulation of the ‘Wehrmacht’ in May 1945 did not affect government bond values (except for Belgium), which suggests that the German defeat was predicted much earlier. From the perspective of capital markets, the “official” end of WWII is of lesser importance. More relevant was the decision of the Allied Powers to accept only a total capitulation on all fronts (taken at the Yalta Conference in February 1945). The post-war arrangement, giving Austria back its statehood (Potsdam Conference in August 1945), was predictably associated with a significant rise in Austrian government bonds.

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